Bloomenergy®

BROCHURE

Energy Server® SOFC System with integrated Heat Capture

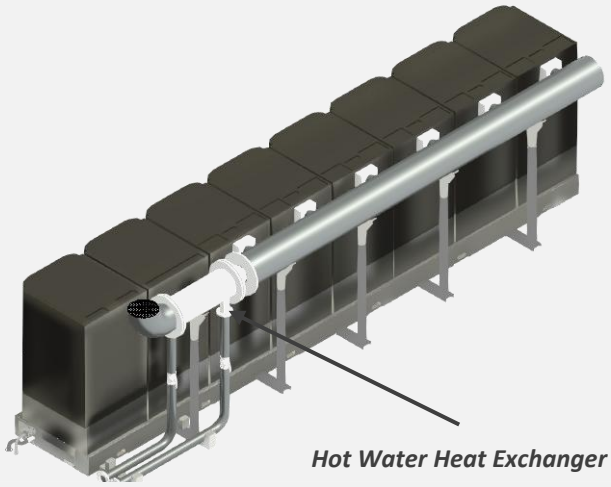
Power & Hot Water

Bloom Energy is a world leader in fuel cell-based power generation. With a platform based on solid oxide fuel cell (SOFC) technology, the Bloom Energy Server uses an electrochemical reaction to convert fuel to energy. The Energy Server SOFC system is hydrogen-ready and fuel-flexible, capable of operating on natural gas, biogas, hydrogen, or a blend of these fuels. The system can be configured as a primary power solution—operating in parallel with the grid, as a microgrid to increase the power system's resiliency, or as an off-grid load-following system.

The Energy Server system can produce clean energy at one of the highest efficiencies on the market today. Its internal operating temperature is around 800°C, resulting in high-grade exhaust heat. Through Cogeneration integration, overall system efficiency and project economics significantly increase.

The integrated system (Energy Server system + heat exchanger) is fully factory-packaged and available in block sizes of 325 kW, with scalability to hundreds of megawatts. The installation can be ground-mounted or stacked, providing best-in-class power density and flexibility, allowing customers to generate both power and heat in as little as three months.

The emission reduction and efficiency increase achieved through integration far exceed the requirements of the EU Directive on energy efficiency and other global regulations.

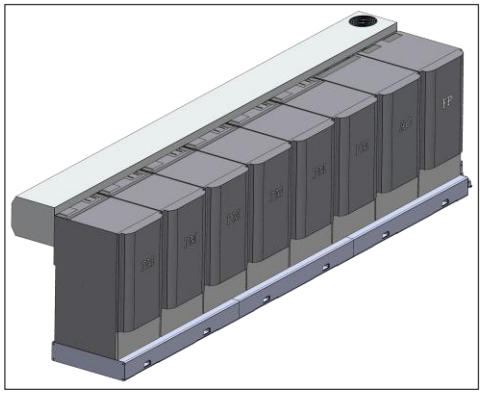


Hot Water Heat Exchanger

The Bloom Energy Server system with an integrated heat exchanger is a modular, plug-and-play solution that delivers industry-leading electrical and thermal efficiency.

What is the Energy Server system with integrated Heat Capture?

The Energy Server system with integrated Heat Capture features a modular design with a base building block of 325 kW. It consists of exhaust adapters installed on the back of the Power Modules that harness the high-temperature heat. The integrated system consists of a factory-fitted hot water generation system at the back of each block, which includes a heat exchanger, water piping, and associated auxiliaries.



Bloom integrated Heat Capture with an aesthetic enclosure

Integrated design

By arriving pre-assembled on site, these units drastically reduce onsite installation time and costs, ensuring customer operations are up and running swiftly. The fully packaged system provides enhanced safety, eliminating onsite complexities, and benefit from the reliability of systems tested and optimized under stringent factory conditions.

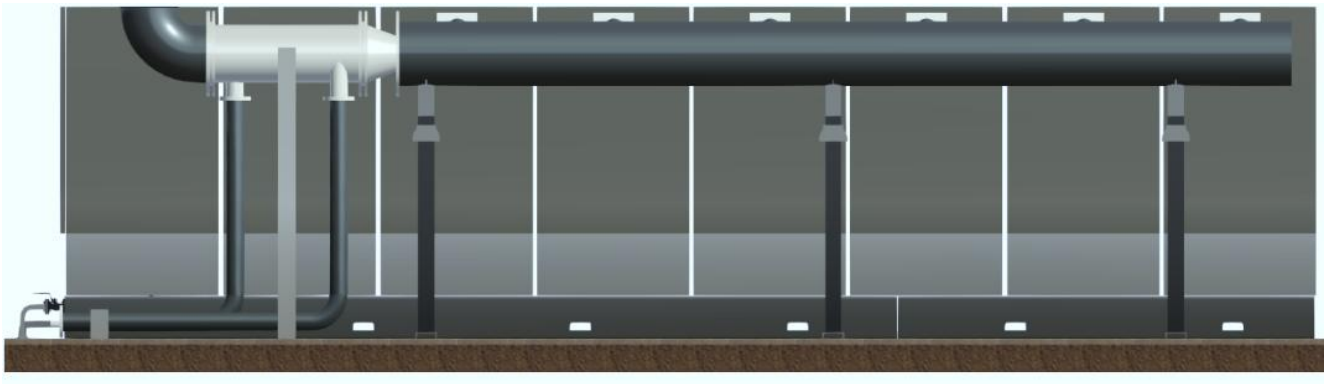
Strategic benefits of the integrated system

Energy Efficiency: Onsite electricity generation with the reuse of waste heat boosts total energy utilization and reduces dependency on inefficient grid-sourced electricity and natural gas-based boilers.

Cost Savings: Lower capital and operational expenses with a reduced total cost of ownership through lower utility and gas bills, and fewer backup systems.

Scalability and Flexibility: The modular, plug-and-play system allows for rapid deployment without the delays or constraints of grid interconnection, enabling agile growth as the customer plant expands.

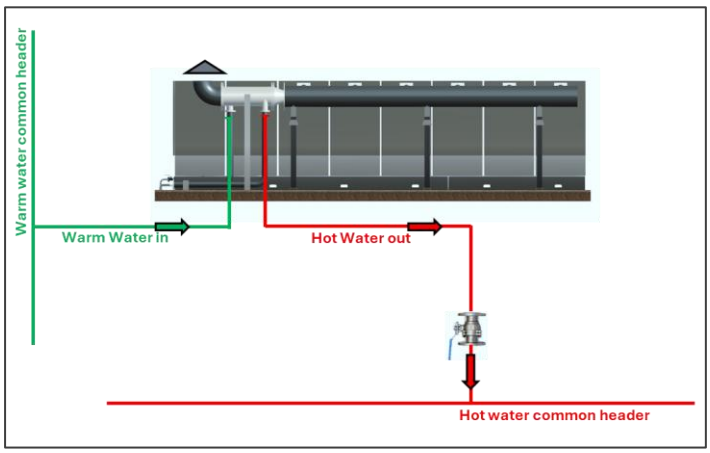
Reliability and Resilience: Consistent 24/7, local power supply and heating. Integrated into a microgrid, these systems ensure uninterrupted operations during outages and enhance energy security.



Typical Layout of the Integrated System

The figure to the right shows a typical layout of the Energy Server system with integrated Heat Capture. A customer can effectively utilize the hot water produced by this system by incorporating it into their building's heating and hot water infrastructure. The hot water is connected to a thermal storage tank or directly to the customers' hot water distribution network.

This solution promises superior quality control, fewer logistical hurdles, and a seamless transition from delivery to operation.



Bloom integrated Heat Capture system

	Lifetime Average
Electrical Efficiency	54 %
Thermal Efficiency	~28.5 %
Total Cogen Efficiency	~82.5 %
Hot Water Generation	2,777 kg/h 12.23 GPM 162 kW 0.55 MMBtu/hr
Hot Water Temperature (out)**	100 °C 212 °F
Hot Water Temperature (in)*	50 °C 122 °F
Hot Water line pressure	5 (max 16) bar(g) 72.5 (max 232) psi (g)
CO_2 emissions	269 kg/MWh
Water interface (DN)	2" (#300 RF)

Table 1: Performance Highlights - 325 kW System

* Hot water temperature range (in) – 30 – 80°C/ 86-122°F
**Hot water temperature range (out) – 80-150°C/ 176-302°F

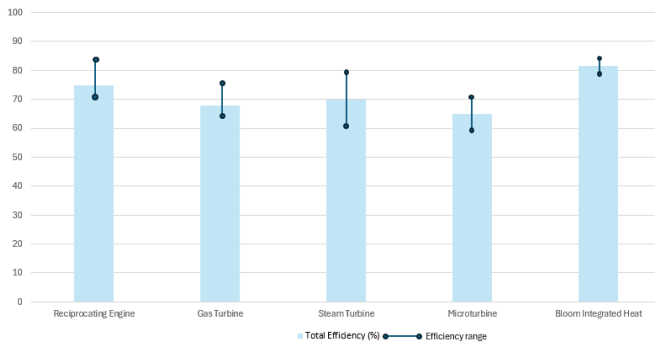
Notes:
1. Values for reference only, system performance depends on site and system specifics. All values displayed in Table 1 are estimates based on modeling data, which have an accuracy of +/- 5% compared to actual field data.
2. Data assumes pipeline natural gas as fuel and an ambient air temperature of 15 °C.
3. Temperature measurements are made at terminal points at the skid.
4. Values calculated at 95% Total Maximum Output (TMO).

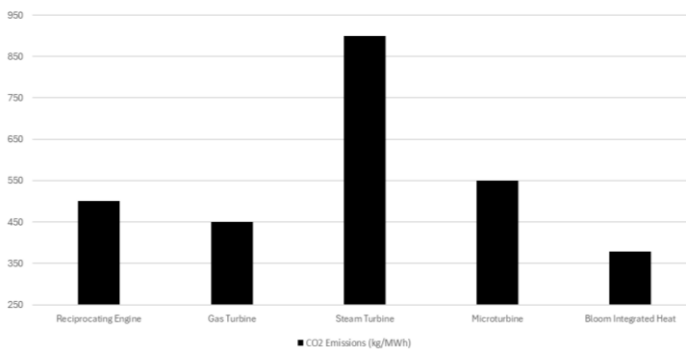
Energy Server Data Sheet

Typical Applications and Advantages

The typical applications include district heating systems, data centers, and commercial and industrial applications such as hospitals, hotels and resorts, and industrial applications such as food processing and chemicals.

The SOFC system integrated Heat Capture system represents a cutting-edge solution in onsite energy generation, offering unmatched performance in both efficiency and environmental impact. With high total system efficiencies, these systems deliver superior energy efficiency compared to conventional CHP technologies, as seen in the representation below[1]. Unlike combustion-based systems, fuel cells operate through an electrochemical process, resulting in ultra-low emissions of CO_2, NO_x, and SO_x[1]—making them ideal for applications in urban centers and environmentally sensitive areas. Their quiet operation, compact footprint, and ability to run on natural gas or hydrogen/blends further enhance their appeal for sustainable infrastructure. As industries seek cleaner, more resilient energy solutions, the Bloom Energy Server system with Heat Capture stands out as a future-ready choice.





[1] CHP Benefits | US EPA , CHPGuide2015.pdf
[2] EPA Technical Support Document on Natural Gas and Oil-fired Steam Units
Emission Reduction Calculations based on the following Parameters: 4,5. Calculated in MT CO2e/year by avoiding the use a 90% efficient natural gas-powered boilers for hot water and steam generation.

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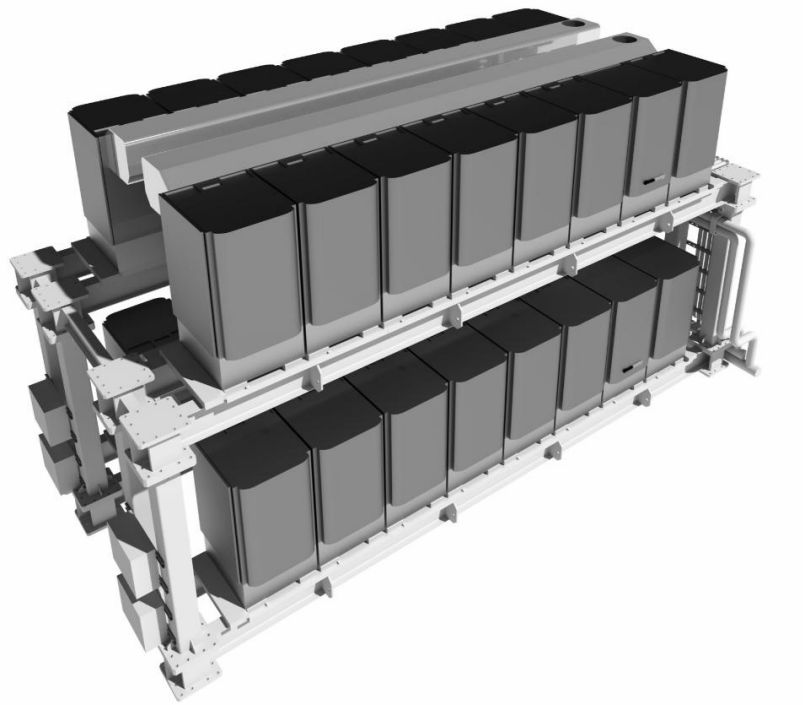
Available Configurations

The Bloom integrated Heat Capture system is scalable, with building blocks ranging from 325 kW to multiple megawatt systems, to fit any customer's needs. The system can be installed in either a ground-mounted or stacked configuration.

325 kW Ground-Mounted Configuration

Electrical output	325kW
Hot Water Output	2,777 kg/h (162kW/ 0.55MMBtu/hr)
Footprint (L x W x H)	9.0m x 2.0m x 2.5m



1.3 MW Stacked Configuration

Electrical output	1.3 MW
Hot Water Output	11,108 kg/h (648kW/ 2.2MMBtu/hr)
Footprint (L x W x H)	19m x 12m x 6m

The heat captured from a Bloom Energy Server system can also be used to produce **steam or chilling**. Learn more here:

Chilling applications

Steam applications

Heat Capture brochure

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